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State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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May 20, 1999

Ron Ryan
SF Phosphates Limited Company
9401 North Highway 91
Vernal, Utah 84087-7802

Re: Review of Plan Of Operations (POO) Submission/Notice of Intention to Revise Large Mining Operations, Tailings Storage Facility Expansion, SF Phosphates Limited Company (SF), Vernal Phosphate Operations, M/047/007 (UTU-76097), Uintah County, Utah

Dear Mr. Ryan:

The Division has completed a review of the POO received October 27, 1998 according to the requirements of the Minerals Rules for a Notice of Intention to Revise Large Mining Operations submission. After reviewing this information, the Division has the following comments which will need to be addressed before approval of this modification may be granted. The comments are listed under the applicable Minerals Rule heading. Please format your response in a similar fashion.

The Environmental Assessment (EA) UT-080-1999-14 associated with the Tailings Storage Facility (TSF) expansion was received by the Division on March 5, 1999. Division comments on the EA were provided in a separate letter dated April 5, 1999 sent to JBR Environmental Consultants, Inc.

The Division will suspend further review of the Vernal Phosphate Operations, Tailings Storage Facility Expansion Revision until your response to this letter is received. If you have any questions in this regard please contact me, Tony Gallegos, Lynn Kunzler, or Tom Munson of the Minerals Staff. If you wish to arrange a meeting to discuss this review, please contact us at your earliest convenience. Thank you for your cooperation.

Sincerely,

D. Wayne Hedberg
Permit Supervisor
Minerals Regulatory Program

jb
Enclosures: Review & revision form (MR-REV)
cc: Pete Sokolosky, BLM Vernal FO
m47-07r.rvw

REVIEW OF NOTICE OF INTENTION TO REVISE LARGE MINING OPERATIONS

SF Phosphates Limited Company
Vernal Phosphate Operations
Tailings Storage Facility Expansion
M/047/007

May 18, 1999

R647-4-104 - Filing Requirements and Review Procedures

The Division considers this Plan Of Operations (POO) submission as a revision to the existing Large Mine Operation Notice of Intention (NOI-LMO) filed with the Division. A revision (or amendment) to an existing NOI-LMO must include all the information concerning the modification which would have been required if it had been included in the original NOI. Ideally, the revision application should be a "stand-alone" document which includes all the information necessary to conduct a complete review.

Under the Minerals Rules, a "revision" means a ***significant*** change to the approved NOI. A revision requires public notice, while an amendment does not. The modification described by the POO has been classified as a "Revision" based on the Division's 1991 policy for defining amendments and revisions.

This proposal was considered a revision because it will meet three of the following four criteria:

(1) the disturbed acreage ***will*** increase by 50% of the existing acreage or 50 acres, whichever is smaller.

(2) the surety ***will*** increase by 25% of the existing surety or $50,000, whichever is smaller.

(3) the overall additional environmental impacts ***were not*** considered significant when compared to the impacts already affecting the site.

(4) the impacts proposed in this modification ***are*** significant enough to warrant public comment as evidenced by the BLM's requirement for an EA.

When this revision satisfies the tentative approval requirements, the Division will publish a public notice of tentative approval to initiate the 30-day public comment period. Final approval of the revision would not occur until after the termination of the public comment period, and if appropriate, the posting of an acceptable reclamation surety. After the public comment period, the final and complete revision submission will need to be assembled as a "stand alone" document to become part of the existing approved mining and reclamation plan volumes. (AAG)

R647-4-104 - Operator's, Surface and Mineral Ownership

The POO was intended to satisfy BLM permitting requirements for the Tailings Storage Facility (TSF) expansion disturbances which will occur on lands involving federal surface or mineral rights. Given the required time frames for preparation and review of an EA, the Division understands why the federal land submission was submitted first. The Minerals Rules of the Utah Mined Land Reclamation Act apply to mining disturbances on federal, private or patented lands. SF will need to submit a revision response to this review which addresses the proposed TSF expansion disturbances on both federal and private lands to the Division. (AAG)

R647-4-105 - Maps, Drawings & Photographs

105.2 Surface facilities map
Please provide a surface facilities map of the TSF at a sufficient scale to allow measurement of acreages. The scale of 1 inch to 800 feet used on Figure 2 does not allow for accurate measurement of acreages on this figure. A scale of 1 inch to 500 feet is typically requested for a surface facilities map, however, a different scale may be used if the map size becomes too cumbersome. Please use multiple sheets if needed to provide adequate coverage. The surface facilities map should include a border identifying the current TSF disturbed area boundary and the limits of the disturbance currently permitted with the Division. This map should identify both federal and private lands. (AAG)

105.3 Drawings or Cross Sections (slopes, roads, pads, etc.)
Please label the discharge points for the fine tailings slimes and coarser tailings on Figure 2 or other appropriate drawing. Please label the three main collector drains used to collect seepage from the tailings dam on Figure 2, or other appropriate drawing. (AAG)

R647-4-106 - Operation Plan

106.3 Estimated acreages disturbed, reclaimed, annually.
Section 3.B. page 17 mentions that construction materials (e.g., rip rap) for raising the tailings dam (lift) will be mined from a ridge within the impoundment area. Will all of this borrow area be inundated by tailings material during the life of the TSF, or will this borrow area require reclamation? It is our understanding that portions of the proposed borrow area have split surface and mineral estates. The surface rights are held by SF with the mineral rights held by the BLM. What is the BLM's position on the use of this borrow site? Will a mineral materials sale be required to use that portion of the proposed borrow area with split surface and mineral rights? (AAG)

106.4 Nature of materials mined, waste and estimated tonnages
Does SF have results of EP Toxicity tests which are more current than the 1982 data contained in table 2-1 of the POO? Please explain why tests which are over 16 years old adequately characterize the current tailings materials. Please describe where these samples were collected and the method of collection.

Does SF have analyses of Totals Metals and TCLP results for the tailings solids which are more recent than those shown in Tables 2-2 and 2-1 which were analyzed in 1991? Please explain why these test results which are seven years old are adequate to characterize the present and future process tailings.

What is the status of the ground water permit to be issued by the Division of Water Quality?

Has SF collected and analyzed additional tailings water samples other than the one grab sample taken in 1996 with analysis results shown in table 2-7? Please provide these analyses if available, or explain why additional sampling is unnecessary.

What regulations and permitting requirements under the Division of Radiation Control apply to the tailings facility due to the levels of alpha and beta radiation at 14 and 25 pCi/l, respectively? Please describe any permitting requirements for these characteristics under the ground water permit issued by the Division of Water Quality. (AAG)

106.5 Existing soil types, location, amount

Soils information is limited to a statement that the soils in the project vicinity are sparse and poorly developed, and would be extremely difficult to salvage because of the large natural variations in topography. While the Division concurs that soil salvage would be very difficult, the use of topsoil greatly improves the likelihood of revegetation success. Please provide specific data to demonstrate the general lack of soil material in the area to be impacted by the TSF expansion to justify not salvaging topsoil. This data could be provided by submitting a soil survey of the area. (LK)

106.6 Plan for protecting & redepositing soils

The proposed plan does not include salvaging topsoil from the expansion area (see R647-4-106.5). A plan for salvaging and redepositing soils may not be needed if a variance for these practices is granted. The Division will hold comment on this section pending the outcome of variance requests under section R647-4-112. (LK)

106.7 Existing vegetation - species and amount

Vegetation information is limited to a list of common species found on the area. The species list is typical of what is found in a mountain shrub community. No vegetation ground cover data was submitted. It is assumed that the vegetation is similar to the other mountain shrub communities within the mine plan area. Please provide information to support this assumption, or provide the results of a vegetation survey describing vegetation types and cover amounts for the TSF area. (LK)

106.8 Depth to groundwater, extent of overburden, geology

Section 2.G, page13 of the POO states that the absence of detailed geologic mapping prior to initial tailings deposition and the absence of sufficiently deep drill holes to the west, south, or east of the TSF make it difficult to determine whether a fold is present beneath the TSF. Later in section 2.H. the POO states that no faults have been mapped or otherwise identified beneath or in the vicinity of the TSF. The second statement implies that no faults are present beneath the TSF, while the first states the presence of faults beneath the TSF is unknown. Please clarify these conflicting statements.

Section 2.H., page 13 states that Golder has measured the permeability in the Moenkopi Formation in the vicinity of the TSF. Are the results of these measurements presented in the POO? How do these permeabilities compare with those from the 1982 packer tests by IECO ranging from 0 to 3.3 x 10^{-5} cm/sec?

Section 2.H., page 15 states that the southward dip of bedrock in the TSF could make it possible for migration of water from the TSF down dip to the south if fracturing in the Moenkopi is sufficiently extensive. This section further states that if the anticlinal axis mapped to the north of the TSF extends beneath the site of the TSF and has folded the Moenkopi, tension fracturing near the

anticlinal axis could be present. What information has been collected to determine the likelihood of migration of TSF water, or the presence of tension fracturing? (AAG)

R647-4-107 - Operation Practices

107.5 Suitable soils removed & stored
See comments under R647-4-106.5 and 106.6. (LK)

107.6 Concurrent reclamation
Final revegetation will begin on the downstream face of the tailings dam as soon as construction of each raise is completed. Timing will be adjusted to take advantage of the seeding window to maximized the probability of vegetative success. This plan is acceptable to the Division.

The reclamation plan also discusses the use of vegetation test plots to determine how best to reclaim the tailings surface. Please provide the specific test plot design for the Division's review and approval. At a minimum, the design needs to show the proposed location of the test plots, the treatments to be used (including depth of tailings to be used (recommended minimum of 4 feet), seed mixes, fertilizers, soil amendments, etc.), how the test plots will be protected, and the time frame for construction and monitoring of the test plots. (LK)

R647-4-109 - Impact Assessment

109.3 Impacts on existing soils resources
Under the proposed plan, existing soils resources for the TSF expansion area will be lost. Variances for not salvaging or replacing soils will need to be requested. These requests will need to include justification for granting the variance (i.e. documentation as to the general lack and/or poor quality of the soils. The soils survey requested under R647-4-106.5 may provide the needed justification). (LK)

R647-4-110 - Reclamation Plan

110.2 Roads, highwalls, slopes, drainages, pits, etc., reclaimed
Section 4.D., page 22, describes the post mine topography of the tailings surface as having a final grade on the tailings solids toward the north end of the tailings dam where a spillway will be excavated. This grade will be created by adjusting the tailings discharge points. Please describe the conceptual location of these tailings discharge points and how this grade will be created. Please describe the spillway channel design and provide a cross section drawing of this channel.

Section 4.E., page 23, states that past experience with the older tailings has shown natural vegetation occurs quite readily on the tailings surface. Please describe the basis and duration of this past experience. What are the long term vegetation success rates? Has salt accumulation occurred in these areas? What is the approximate age of this vegetation on the older tailings?

Section 4.E.d., page 24, states that no molybdenosis has been observed. Does this statement refer to vegetation on the tailings impoundment or revegetation on the reclaimed mine area? Options described to adjust the copper and molybdenum levels included using a fertilizer amendment which includes chelated copper or copper. What methods of dispersion/application and what application rates would be used to implement these options if necessary? What are the typical costs for these amendments?

Section 4.F.h., page 27, states when the tailings have dried to the point where they will support heavy equipment, the nurse crop will be tilled in and the tailings will be seeded using a species mix based on the test plots. Are there any predictions for the length of time needed for the tailings to dry sufficiently to allow heavy equipment access? Is it possible to create more irregularities in the final tailings surface by creating mounds or indentations, placing rocks or rock piles randomly across the surface, or placing woody debris randomly? These treatments would possibly prevent drill seeding for these specific areas and require broadcast seeding.

Section 4.G., page 29, describes three tests to be conducted by using test plots during the operational life of the TSF. The Division agrees with the use of test plots, however, a conceptual reclamation plan must be provided in this revision for the purpose of calculating a reclamation cost estimate. The reclamation plan can be modified in the future if test plot data supports such modifications.

What are the plans for the monitoring, and managing tailings dam seepage during the years after seeding is complete, but before final reclamation release? (AAG)

110.5 Revegetation planting program

The Division recognizes that a proposed plan today may in fact be altered before final reclamation is completed as data from test plots and contemporaneous reclamation monitoring dictate. After reviewing the proposal, it appears that as soon as the water is off the tailing surface, a nurse crop will be seeded by aerial means. After the tailing have dried sufficiently to allow heavy equipment to operate on the surface, the nurse crop will be tilled in to provide a portion of the lacking organic matter of the tailings. The final seed mixes will then be planted. Fertilizer will be used (see item 3 below). The proposed fall seeding is acceptable. However, several details of the revegetation plan are lacking. These details are needed at this time for the revegetation plan to calculate the reclamation cost estimate. The detailed plan would be based on current knowledge as to what would most likely be utilized to establish vegetation. Specific items that still need to be addressed include:

1. What seeding method (broadcast or drilling) will be used. If a combination will be used, then the areas for each seeding method needs to be identified on a reclamation map.

2. A specific seed mix which includes the species and the seeding rate (where plans to establish woody plants from transplants, the proposed number of plants per acre is needed). While Tables 9-12 include potential reclamation species, will all the listed species in these tables be used?

3. What amendments will be added, and at what rate (it is assumed that nitrogen phosphorus and potassium fertilizers will be used as recommended on page 27 of the submission. This needs to be confirmed). The plan also identifies the tailings will be amended with organic matter (10 ton/acre needed). This will be achieved by incorporating the nurse crop and addition of sewage sludge, hay or straw, manure, sawdust or sawmill scraps, or commercial organic fertilizers. Again, specific organic amendment(s) and rate(s) need to be provided. Due to the high nitrogen demands of straw, sawdust and sawmill scraps, it is recommended that these not be used (unless data from test plots show successful revegatation using these amendments). To determine the rates of these amendments, an approximation of the amount of organic matter the nurse crop will add to the tailings will need to be made. Please provide an estimate of the organic matter added to the tailings by the nurse crop. (LK).

R647-4-111 - Reclamation Practices

111.12 Topsoil redistribution
Assuming a variance is ultimately granted for salvaging soil, the tailings material will be amended to support adequate vegetation without the use of topsoil. (LK)

R647-4-112 - Variance
Variances to Rules R647-4-107.5 for salvaging and storing soil, and 111.12 for redistribution of soils will need to be requested and justified. See comments under R647-4-109.3. (LK)

R647-4-113 - Surety
Section 6.0, page 31, of the POO describes the reclamation cost estimate for only those disturbances on BLM lands (approximately 23.8 acres). The estimate uses a unit cost from the Means Heavy Construction Cost Data 1998 for hydroseeding with mulch and fertilizer at a seeding rate of 6 pounds per thousand square feet. This unit cost is acceptable for a rough estimate; however, the seeding rate of six pounds per thousand square feet would equate to a seed rate of approximately 261 pounds/acre which is far in excess of the usual seeding rate. A seeding rate of 20 pounds per acre would equate to approximately 0.4 pounds/1,000 square feet.

The subtotal of $2,026/acre multiplied by 23.8 acres is then increased by 10% for an administrative fee. Division cost estimates typically include a contingency factor of 10%; however, BLM estimates are believed to require an 18% increase for management and overhead.

This rough estimate may be conservative for hydroseeding, however, the estimate does not include costs for: aerial seeding of the nurse crop, ripping the nurse crop into the tailings surface, planting containerized woody-species plants, adding organic matter, revegetation and drain down monitoring after seeding, equipment mobilization, and escalation. A revised estimate which includes costs for these tasks will need to be provided.

This rough estimate does not include costs for reclamation of the TSF expansion area which is not located on BLM lands. The Division's regulations apply to the disturbances on federal and private lands. A revised reclamation estimate which includes costs for reclamation of the entire expansion area will need to be provided to the Division.

The reclamation surety estimate for the NOI-LMO was due for review in 1998. It would be more efficient to review the surety estimate for the entire operation now in conjunction with the evaluation of the surety for the TSF expansion. This review is also timely, since a detailed reclamation plan for the current tailings surface was not included in the previously approved NOI-LMO for this operation. As part of the approved NOI a detailed reclamation plan for the tailings was to be developed based on information gathered from vegetation test plots. The test plots have not been formally implemented to date, and therefore, the proposal of the use of test plots for this tailings expansion is also timely.

The Division will coordinate with the BLM and SF to the extent possible regarding the possibility of posting one reclamation surety instrument jointly listing the BLM and Division and acceptable to both agencies. (AAG)

R647-4-115 - Confidential Information

No information contained in the POO submission was identified as confidential. (AAG)

R647-4-116 - Public Notice & Appeals

The Division will publish a public notice when the revision information has satisfied the requirements for tentative approval. The public notice will initiate a 30-day public comment period, after which the revision may proceed to receive final approval after the posting of an acceptable surety. (AAG)